

# Preliminary Reassessment

FMRI

Muskogee County

CERCLA ID # OK03549

Muskogee, Oklahoma

June 12, 2018

Prepared by:

Todd Downham

A handwritten signature in black ink that reads "W. Todd Downham". The signature is fluid and cursive, with a long horizontal stroke at the end.

Environmental Programs Specialist IV

Approved by:

Hal Cantwell

A handwritten signature in black ink that reads "Hal Cantwell". The signature is cursive and somewhat stylized, with the first name being more prominent.

Environmental Programs Specialist IV

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## **I. Introduction**

The State of Oklahoma Department of Environmental Quality (DEQ) is tasked by the U.S. Environmental Protection Agency (EPA), as authorized by CERCLA and as amended by SARA, to perform a Preliminary Reassessment of FMRI, formally Fansteel Inc., Muskogee County (CERCLA ID# OK03549). The primary purpose of this Preliminary Assessment/Reassessment is to assess the immediate or potential threat of wastes at the site that may impact public and environmental health and to collect information sufficient to support a decision regarding the need for further action under CERCLA/SARA. The scope of this investigation includes the review of available information from DEQ and other State agencies' files, and a comprehensive target survey, (Reference 1).

## **II. Site Description, Environmental Justice, Operational History, and Waste Characteristics**

### *Site Description*

FMRI is located in the SE ¼ of Section 17 T15N R19E and SW ¼ of Section 16 T15N R19E, Muskogee County, Oklahoma. The site's center has coordinates of 35°46'25.969" N latitude and -95°18'18.311" W longitude, and located approximately 4.5 miles northeast of downtown Muskogee, Oklahoma. The site is bordered on the North by several commercial/industrial properties, on the South by state highway 62, on the East by the Arkansas River, and West by the BNSF railroad (Figure 1). The approximate total acreage is 140 acres (Reference 2).

FMRI, formerly Fansteel Inc. (Fansteel), was constructed in 1956 and operated from 1956 to 1989 producing tantalum and columbium rare earth metals (Reference 3). The site has numerous structures and ponds associated with the facility. Portions of the site are well vegetated with grasses and trees (Figure 2).

Fencing secures the site, but can be accessed through the main entrance on the western boundary of the property. There are 8 people living between the site and ¼ mile study radius (Reference 4). There are no residences located on the site and no schools or daycares within 200 feet of the site.

Muskogee County is in the Central Lowland physiographic province. The summers are hot and the winters are cool. The mean annual precipitation is 42 inches and the average annual runoff is approximately 8 inches (Reference 5).

### *Environmental Justice*

The site may have environmental justice issues. The median household income in Muskogee, Oklahoma is \$36,232 compared to \$48,038 in the State. The percentage of persons below poverty level in Muskogee, Oklahoma is 23.6 % (Reference 6).

### *Operational History*

The area had not been developed for any use prior to construction of the Fansteel facility, and no previous structures existed. The site has continued to be occupied by Fansteel since termination of processing in 1990. Chemical processing equipment used in the extraction of tantalum and columbium from ores and slags was sold and removed from the site in 1990-1992. From 1999-2001, a new chemical extraction process was implemented and then suspended in late 2001 (Reference 3).

In 2004, Fansteel went into bankruptcy. As part of a court-ordered reorganization, a separate subsidiary, FMRI, was formed for the sole purpose of site cleanup and decommissioning. The reorganization also required that the parent corporation, Fansteel, make scheduled payments to FMRI for decommissioning the site. Fansteel defaulted on its obligation under the bankruptcy to pay for site decommissioning at the end of 2013. Fansteel then made monthly payments to continue operations at the site. Fansteel went into bankruptcy again in 2016. Groundwater collection and monitoring are ongoing while funding continues (Reference 3).

### *Waste Characteristics*

The tantalum and columbium ores and slags processed by Fansteel contained concentrations of radioactive uranium and thorium which was an unintended byproduct. The levels were sufficient to be classified by the Nuclear Regulatory Commission (NRC) as source material. FMRI operates under NRC License No. SMB-911 for decommissioning of the radiological contaminants (Reference 3).

Non-radiological contaminants at the site include arsenic, ammonia, fluoride, lead, and trichloroethylene (TCE). Production processes also included 70% hydrofluoric acid, sulfuric acid, methyl isobutyl ketone (MIBK), anhydrous ammonia, 35% hydrochloric acid, 45% liquid caustic potash, nitric acid, sodium chloride, and potassium chloride. Other compounds included janitorial and maintenance related chemicals. Lead based paint and asbestos is believed to be present in the structures on site (Reference 3).

Several releases of contaminants occurred in the late 1970s and 1980s, the largest of which was in June 1989 when a large supernatant discharge from Pond 3, and several seeps, caused portions of the french drain system to collapse. An estimated 90,000 gallons of fluid was released into the Arkansas River. References state that Fansteel notified the National Response Center, State

Response Commission, Muskogee Local Emergency Committee, and NRC immediately after the release was brought under control, and again in writing on June 22, 1989 in accordance with PL99-499 (Superfund Amendments and Reauthorization Act Title III, Section 304) and related regulations. No sampling was conducted after the releases (Reference 3).

A TCE plume was discovered on the property in 2007 and was further characterized, but not fully delineated, in 2015. Samples of groundwater, soil and sub-slab vapors were assessed for TCE in 2015. The 2015 results reported exceedances of TCE levels for soil, groundwater, and sub-slab vapors in buildings (Reference 3).

Contaminated groundwater is collected in an intercept trench and treated by neutralization prior to discharge to the Arkansas River. Discharges to the river are regulated through the Oklahoma Pollutant Discharge Elimination System (OPDES) Permit No. OK0001643 (Reference 3).

Under the NRC license, Fansteel developed a Decommissioning Plan (DP) for the removal of radioactive contamination. The DP was a four phased approach designed to make the site suitable for unrestricted release under an “industrial use scenario”. Site operations since 2001 have been limited to environmental monitoring, groundwater treatment, maintenance of buildings, grounds, and equipment remaining at the site; and cleanup of operating areas. Phase I of the DP was to begin by September 1, 2004 and be completed by March 31, 2006, FMRI commenced with phase 1 work during 2005 but has yet to complete the phase. Phases II-IV were to commence in sequence (Reference 3).

Radioactive and non-radioactive contamination remains in the ground at the site, in waste pond sludges, as contaminated soil, and as contamination in buildings and equipment. Additionally, one of the buildings used to store “super sacks” of contaminated soils, requires respiratory protection from Radon gas. Although a survey to characterize the extent of radioactive contamination was conducted in 1993, additional radiation surveys will need to be performed. Furthermore, assessment of non-radiological contaminants has been limited, and additional characterization is required to further assess contamination (Reference 3).

#### *Previous Investigations*

Numerous investigations are known to have occurred and are documented in the Site History Memorandum (Reference 3).

### **III. Pathway and Environment Hazard Assessment**

#### *Ground Water*

The groundwater under the site is found approximately 20 feet below the ground surface. The general direction of flow is eastward toward the Arkansas River (Reference 5).

The primary aquifer in the vicinity of the site is the Arkansas River alluvium and terrace deposits; however, the alluvium directly beneath the site is not considered an aquifer because the groundwater yields are not significant enough for use, and the groundwater quality generally ranges from poor to fair (greater than 500 ppm total dissolved solids) (Reference 5).

The Boggy Formation will yield only limited amounts of water of poor to fair quality. There are no major bedrock aquifers under the site and this is not a major recharge area for any major bedrock aquifers (Reference 5).

The nearest domestic well is approximately 0.45 miles northwest of the site. The well reaches water at approximately 20 feet below the surface (Figure 3, Reference 5).

An observed release to ground water has been documented in previous investigations (Reference 3). Numerous ground water monitoring wells are present on site (Figure 2).

#### *Geology*

The FMRI, formerly Fansteel Metals Inc., site sits on Quaternary-age alluvium associated with the Arkansas River. The alluvium consists of gravel, sand, silt, and clay in channels and on flood plains of modern streams. The alluvium includes terrace deposits of similar composition located directly above and adjacent to modern channels and flood plains. Thickness ranges from 0 to 50 feet (Reference 5).

The Pennsylvanian-age Boggy Formation underlies the alluvium. The Boggy Formation is composed of shale, sandstone, limestone, and coal members. Shale members are primarily blueish gray while sandstone members are brown to gray in color. Marker beds within the Boggy Formation include the Bluejacket Sandstone, defining the base of the formation, followed by the Inola Limestone member. The upper member of the Boggy Formation is defined by the Taft Sandstone which is capped by the Weir-Pittsburg coal bed. Total maximum thickness of the Boggy Formation in the Muskogee County area is approximately 300 feet (Reference 5).

### Hydrogeology

The primary aquifer in the vicinity of the site is the Arkansas River alluvium and terrace deposits; however, the alluvium directly beneath the site is not considered an aquifer because the groundwater yields are not significant enough for use, and the groundwater quality generally ranges from poor to fair (greater than 500 ppm total dissolved solids) (Reference 5).

The Boggy Formation will yield only limited amounts of water of poor to fair quality. There are no major bedrock aquifers under the site and this is not a major recharge area for any major bedrock aquifers (Reference 5).

According to the Oklahoma Corporation Commission, there are no reported underground storage tanks on the site. However, there are numerous underground storage tanks within a four mile radius of the site and several up-gradient that are either still in use or have been closed/removed (Figure 4, Reference 2 and 7).

The primary water supply for the City of Muskogee is from Fort Gibson Reservoir, located approximately 9 miles northeast of the site (Reference 3).

The nearest domestic ground water well is located .45 miles northwest of the site (Figure 3). Total population served by private wells is shown in the table below. The numbers were arrived at by multiplying the number of wells by the estimated average number of persons (2.41) per household in Muskogee, OK (References 4 and 8).

Private Wells

Distance from site (mile)	Number of Wells	Est. Population Served by Private Wells
On-site	0	0
0 - ¼	0	0
¼ - ½	1	2.41
½ - 1	4	9.64
1-2	12	28.92
2-3	12	28.92
3-4	21	50.61
<b>Total</b>	50	120.5

### *Surface Water*

On the northern half of the site, surface water drainage appears to flow in a northeast direction towards the Arkansas River. On the southern half of the site, surface water drainage appears to flow into an intermittent creek that originates on site and flows to the southeast towards the Arkansas River (Figure 2). The site lies partially within a floodplain (Reference 9). A surface water pathway to the Arkansas River is possible; therefore, the surface water pathway is included in this report. There are several surface water intakes and fisheries, within 15 miles downstream of the site (Figure 5, Reference 2 and 10).

The following state and federally listed threatened, endangered, or protected species have been identified within the study area (References 11 and 12).

<b>Species</b>	<b>Classification</b>
<u>Mammals:</u>	
Gray Bat ( <i>Myotis grisescens</i> )	Endangered
Northern Long-eared Bat ( <i>Myotis septentrionalis</i> )	Threatened
<u>Birds:</u>	
Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	Protected
Interior Least Tern ( <i>Sternula Antillarum athalassos</i> )	Endangered
Piping Plover ( <i>Charadrius melodus</i> )	Threatened
Red Knot ( <i>Calidris cantus rufa</i> )	Threatened
Whooping Crane ( <i>Grus Americana</i> )	Endangered
<u>Insects:</u>	
American Burying Beetle ( <i>Nicrophorus americanus</i> )	Endangered

### *Soil*

There are no schools or daycares located within 200 feet of the site. There are 8 people living between the site and ¼ mile study radius (Reference 2 and 4). The nearest residence is located across the road, adjacent to, and east of the site (Figure 2). There are workers present on site. An observed release to soils on the site is has been observed in previous investigations (Reference 3).



#### *Air*

A particulate release to air is suspected from any contaminated source, which is known to exist on site. One of the buildings used to store “super sacks” of contaminated soils, requires respiratory protection from Radon gas (Reference 3). Air monitoring has been performed historically as a result of contamination on site (Reference 3). The estimated population and wetland acreage within a 4-mile radius of the site are described in the table below (Reference 4).

Estimated Population and Wetland Acreage

<b>Distance from site (mile)</b>	<b>Estimated Population</b>	<b>Estimated Wetland Acreage</b>
On-site	0	0
0 - ¼	8	3076.4
¼ - ½	15	50.5
½ - 1	939	69.7
1-2	2561	175.2
2-3	3309	627.6
3-4	10296	243.2
<b>Total</b>	17128	4242.6

## **IV. Summary and Conclusions**

FMRI, formerly Fansteel Inc. (Fansteel), was constructed in 1956 and operated from 1956 to 1989 producing tantalum and columbium rare earth metals.

The site is known to be contaminated with numerous wastes. Observed releases to ground water, soil and air are documented in previous investigations. A release to surface water is suspected.

There are no schools or daycares located within 200 feet of the site. There are 8 people living between the site and ¼ mile study radius. There are numerous workers present on the site.

There are several surface water diversion points within the 4-mile radius of the site and 15 miles downstream of the site. There are no public water supply wells located within the 4-mile radius of the site. The nearest domestic ground water well is located .45 miles northwest of the site.

As a result of the information gathered during this Preliminary Reassessment, further investigation of the FMRI site, in Muskogee County, is recommended

## VI. References

1. U.S. Environmental Protection Agency. Guidance for Performing Preliminary Assessments under CERCLA, September 1991. <http://www.epa.gov/superfund/sites/npl/hrsres/pa/paguidance.pdf>
2. DEQ, Geographic Information System (GIS) Database for FMRI, Muskogee County, ArcMap version 10.6.
3. McCaskill, L, Department of Environmental Quality. *Memorandum: Site History & References*. May 17, 2018.
4. Downham, T, Department of Environmental Quality. *Memorandum: Wetland and Population*. May 9, 2018.
5. Bufford, K, Department of Environmental Quality. *Memorandum: Hydrogeology and Groundwater Use*. May 16, 2018.
6. U.S. Department of Commerce, Census Bureau. State and City Quick Facts, Selected Economic Characteristics, Muskogee City and Oklahoma State, Oklahoma 2012-2016.
7. Oklahoma Corporation Commission, Petroleum Storage Tank Portal
8. U.S. Department of Commerce, Census Bureau. State Quick Facts, Profile of General Population and Housing Characteristics, Oklahoma State, Oklahoma 2010.
9. U.S. Department of Homeland Security, Flood Insurance Rate Map, Muskogee County, Oklahoma. April 3, 2011.
10. Oklahoma Water Resources Board, Interactive Maps & GIS Data, Surface Water Data, Permitted Surface Water Diversion Points, GIS Shapefile.
11. U.S. Fish and Wildlife Service website:  
<https://ecos.fws.gov/ipac/location/QKQR4MMKMJEDFK4A3PV26JZ6II/resources>
12. Bufford, K, Department of Environmental Quality. Letter to Dr. Todd Fagin, Oklahoma Natural Heritage Inventory, Ecological Systems of Importance, May 16, 2018.

## Reference 1

EPA/540/G-91/013  
Publication 9345.0-01A  
September 1991

# **Guidance for Performing Preliminary Assessments Under CERCLA**

Hazardous Site Evaluation Division  
Office of Emergency and Remedial Response  
Office of Solid Waste and Emergency Response  
U.S. Environmental Protection Agency  
Washington, DC 20460



*Printed on Recycled Paper*

## Reference 2

ArcCatalog - K:\LPD GIS Data\Downham\PASI\FMRI

File Edit View Go Geoprocessing Customize Windows Help



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Contents Preview Description

Name	Type
CSV Files from the OCC	Folder
PASI Info	Folder
Surface Water Intakes	Folder
wells	Folder
15_Mile_Downstream_Location....	Shapefile
200.shp	Shapefile
Closest_Residence.shp	Shapefile
Closest_Residence_.shp	Shapefile
DOC151.jpg	Raster Dataset
Interceptor_Trench.shp	Shapefile
Intermittent_Stream.shp	Shapefile
Monitoring_Wells.shp	Shapefile
Outfalls.shp	Shapefile
Ponds.shp	Shapefile
PWS_Surface_Water_Intake.shp	Shapefile
Roads.shp	Shapefile
Site_Boundary.shp	Shapefile
Site_Boundary_(Approximate).s...	Shapefile
Site_Location.shp	Shapefile
Site_Location_.shp	Shapefile
Structures.shp	Shapefile
Sumps.shp	Shapefile
Surface_Water_Flow_Direction.s...	Shapefile
Trees.shp	Shapefile

### Reference 3



## MEMORANDUM

DATE: May 17, 2018

TO: FMRI, formerly Fansteel Inc., PA File

FROM: Libby McCaskill  
Environmental Programs Specialist

RE: Site History & References

FMRI, formerly Fansteel Inc. (Fansteel), was constructed in 1956 and operated from 1956 to 1989 producing tantalum and columbium rare earth metals. The area had not been developed for any use prior to construction of the Fansteel facility, and no previous structures existed. The site has continued to be occupied by Fansteel since termination of processing in 1990. Chemical processing equipment used in the extraction of tantalum and columbium from ores and slags was sold and removed from the site in 1990-1992. From 1999-2001, a new chemical extraction process was implemented and then suspended in late 2001.

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Several releases of contaminants occurred in the late 1970s and 1980s, the largest of which was in June 1989 when a large supernatant discharge from Pond 3, and several seeps, caused portions of the french drain system to collapse. An estimated 90,000 gallons of fluid was released into the Arkansas River. References state that Fansteel notified the National Response Center, State Response Commission, Muskogee Local Emergency Committee, and NRC immediately after the release was brought under control, and again in writing on June 22, 1989 in accordance with PL99-499 (Superfund Amendments and Reauthorization Act Title III, Section 304) and related regulations. No sampling was conducted after the releases.

A TCE plume was discovered on the property in 2007 and was further characterized, but not fully delineated, in 2015. Samples of groundwater, soil and sub-slab vapors were assessed for TCE in 2015. The 2015 results reported exceedances of TCE levels for soil, groundwater, and sub-slab vapors in buildings.

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suitable for unrestricted release under an “industrial use scenario”. Site operations since 2001 have been limited to environmental monitoring, groundwater treatment, maintenance of buildings, grounds, and equipment remaining at the site; and cleanup of operating areas. Phase I of the DP was to begin by September 1, 2004 and be completed by March 31, 2006, FMRI commenced with phase 1 work during 2005 but has yet to complete the phase. Phases II-IV were to commence in sequence.

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In 2004, Fansteel went into bankruptcy. As part of a court-ordered reorganization, a separate subsidiary, FMRI, was formed for the sole purpose of site cleanup and decommissioning. The reorganization also required that the parent corporation, Fansteel, make scheduled payments to FMRI for decommissioning the site. Fansteel defaulted on its obligation under the bankruptcy to pay for site decommissioning at the end of 2013. Fansteel then made monthly payments to continue operations at the site. Fansteel went into bankruptcy again in 2016. Groundwater collection and monitoring are ongoing while funding continues.

### References

1. Earth Sciences Consultants, Inc. “Remediation Assessment for Fansteel, Inc., Muskogee, Oklahoma Facility.” Volumes 1-4. *ADAMS Public Documents*. Nuclear Regulatory Commission. December 1993. <https://www.nrc.gov/reading-rm/adams.html>.
2. Earth Sciences Consultants, Inc. “Fansteel Inc., Decommissioning Plan” Volumes 1-2. *ADAMS Public Documents*. Nuclear Regulatory Commission. January 14, 2003. <https://www.nrc.gov/reading-rm/adams.html>.
3. Terracon Consultants, Inc. “Limited Site Investigation and Sub-Slab Vapor Investigation”, April 23, 2015.
4. Enercon. “Data Gap Analysis”, April 11, 2016.

#### Reference 4

## Memorandum

To: FMRI, Preliminary Assessment (PA) file

From: Todd Downham

Date: 5/9/2018

Subject: Population and Wetlands within ¼, ½, 1, 2, 3, and 4 mile radius of the FMRI site, Muskogee County, Muskogee Oklahoma.

Population and Wetlands calculations performed with ArcMap software and the programmed model for determining population and wetlands within the above mentioned distances from the site.

The information below is based on current human population and wetlands data.

### Population:

The following data is from U.S. Census Bureau (2010).

Distance	Population (persons)
On site	none
¼ mile	8
½ mile	15
1 mile	939
2 mile	2561
3 mile	3309
4 mile	10296
Total	17128

Wetlands:

The following data is published by the U.S. Fish and Wildlife Service from the National Wetlands Inventory.

Distance	Area (acres)
On site	x
1/4 mile	3076.4
½ mile	50.5
1 mile	69.7
2 mile	175.2
3 mile	627.6
4 mile	243.2
Total	4242.6

## Reference 5

## **Memorandum**

May 16, 2018

To: FMRI, formerly Fansteel Metals Inc., PA File

From: Kelsey Bufford, Environmental Programs Specialist

Re: Hydrogeology and Ground Water Use  
Former Fansteel Site  
10 Tantalum Place  
Muskogee, OK 74401  
SE ¼ of Section 17 T15N R19E  
SW ¼ of Section 18 T15N R19E  
Muskogee County, Oklahoma

Muskogee County is in the Central Lowland physiographic province. The summers are hot and the winters are cool. The mean annual precipitation is 42 inches and the average annual runoff is approximately 8 inches.

### Geology

The FMRI, formerly Fansteel Metals Inc., site sits on Quaternary-age alluvium associated with the Arkansas River. The alluvium consists of gravel, sand, silt, and clay in channels and on flood plains of modern streams. The alluvium includes terrace deposits of similar composition located directly above and adjacent to modern channels and flood plains. Thickness ranges from 0 to 50 feet.

The Pennsylvanian-age Boggy Formation underlies the alluvium. The Boggy Formation is composed of shale, sandstone, limestone, and coal members. Shale members are primarily blueish gray while sandstone members are brown to gray in color. Marker beds within the Boggy Formation include the Bluejacket Sandstone, defining the base of the formation, followed by the Inola Limestone member. The upper member of the Boggy Formation is defined by the Taft Sandstone which is capped by the Weir-Pittsburg coal bed. Total maximum thickness of the Boggy Formation in the Muskogee County area is approximately 300 feet.

### Hydrogeology

The groundwater under the site is found approximately 20 feet below the ground surface. The general direction of flow is eastward toward the Arkansas River.

The primary aquifer in the vicinity of the site is the Arkansas River alluvium and terrace deposits; however, the alluvium directly beneath the site is not considered an aquifer because the groundwater yields are not significant enough for use, and the groundwater quality generally ranges from poor to fair (greater than 500 ppm total dissolved solids).

The Boggy Formation will yield only limited amounts of water of poor to fair quality. There are no major bedrock aquifers under the site and this is not a major recharge area for any major bedrock aquifers.

The nearest domestic well is approximately 0.45 miles northwest of the site. The well reaches water at approximately 20 feet below the surface.

#### References:

Johnson, Kenneth S., 1993, "Maps of Aquifers and Recharge Areas in Oklahoma," Oklahoma State Department of Health, Oklahoma City, Oklahoma.

Marcher, Melvin V., 1969; Second Printing 1988, Hydrologic Atlas 1, "Reconnaissance of the water resources of the Fort Smith quadrangle, east-central Oklahoma," Oklahoma Geological Survey, Norman, Oklahoma.

Mileff, Robert John, 1976, "Geology for Land-Use Planning of the Muskogee Area, Muskogee County, Oklahoma," Thesis submitted to the Faculty of the Graduate College of the Oklahoma State University, Stillwater, Oklahoma.

Oakes, Malcolm C., 1977, "Geology and Mineral Resources (Exclusive of Petroleum) of Muskogee County, Oklahoma," Oklahoma Geological Survey, Bulletin 122, Norman, Oklahoma.

Oklahoma Water Resources Board, 2014, "Groundwater Wells, Standards, and Protection in Oklahoma," <http://www.owrb.ok.gov>, Oklahoma City, Oklahoma.

Stanley, T.M and G.W. Miller, 2007, "Geologic Map of the Coweta 7.5' Quadrangle, Wagoner County, Oklahoma," <http://www.ou.edu/ogs/maps/ogq>, Norman, Oklahoma.



## Reference 6



DP03

## SELECTED ECONOMIC CHARACTERISTICS

2012-2016 American Community Survey 5-Year Estimates

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Data and Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

**Tell us what you think.** Provide feedback to help make American Community Survey data more useful for you.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

Subject	Muskogee city, Oklahoma			
	Estimate	Margin of Error	Percent	Percent Margin of Error
<b>EMPLOYMENT STATUS</b>				
Population 16 years and over	29,571	+/-274	29,571	(X)
In labor force	16,897	+/-469	57.1%	+/-1.5
Civilian labor force	16,897	+/-469	57.1%	+/-1.5
Employed	15,682	+/-499	53.0%	+/-1.6
Unemployed	1,215	+/-193	4.1%	+/-0.6
Armed Forces	0	+/-20	0.0%	+/-0.1
Not in labor force	12,674	+/-448	42.9%	+/-1.5
Civilian labor force	16,897	+/-469	16,897	(X)
Unemployment Rate	(X)	(X)	7.2%	+/-1.2
Females 16 years and over	15,786	+/-244	15,786	(X)
In labor force	8,125	+/-395	51.5%	+/-2.3
Civilian labor force	8,125	+/-395	51.5%	+/-2.3
Employed	7,591	+/-405	48.1%	+/-2.4
Own children of the householder under 6 years	3,221	+/-234	3,221	(X)
All parents in family in labor force	2,043	+/-229	63.4%	+/-5.8
Own children of the householder 6 to 17 years	5,751	+/-289	5,751	(X)
All parents in family in labor force	4,043	+/-336	70.3%	+/-4.5
<b>COMMUTING TO WORK</b>				
Workers 16 years and over	15,280	+/-521	15,280	(X)
Car, truck, or van -- drove alone	12,273	+/-522	80.3%	+/-2.0
Car, truck, or van -- carpooled	1,771	+/-236	11.6%	+/-1.5
Public transportation (excluding taxicab)	88	+/-66	0.6%	+/-0.4
Walked	350	+/-120	2.3%	+/-0.8
Other means	349	+/-114	2.3%	+/-0.7
Worked at home	449	+/-131	2.9%	+/-0.9
Mean travel time to work (minutes)	16.1	+/-0.7	(X)	(X)
<b>OCCUPATION</b>				
Civilian employed population 16 years and over	15,682	+/-499	15,682	(X)
Management, business, science, and arts occupations	4,174	+/-344	26.6%	+/-2.2
Service occupations	3,707	+/-360	23.6%	+/-2.1
Sales and office occupations	3,965	+/-407	25.3%	+/-2.3
Natural resources, construction, and maintenance occupations	1,320	+/-201	8.4%	+/-1.3
Production, transportation, and material moving occupations	2,516	+/-251	16.0%	+/-1.6
<b>INDUSTRY</b>				
Civilian employed population 16 years and over	15,682	+/-499	15,682	(X)
Agriculture, forestry, fishing and hunting, and mining	154	+/-68	1.0%	+/-0.4
Construction	775	+/-150	4.9%	+/-1.0
Manufacturing	2,007	+/-213	12.8%	+/-1.3
Wholesale trade	522	+/-144	3.3%	+/-0.9

Subject	Muskogee city, Oklahoma			
	Estimate	Margin of Error	Percent	Percent Margin of Error
Retail trade	2,070	+/-274	13.2%	+/-1.6
Transportation and warehousing, and utilities	607	+/-156	3.9%	+/-1.0
Information	255	+/-85	1.6%	+/-0.5
Finance and insurance, and real estate and rental and leasing	710	+/-179	4.5%	+/-1.1
Professional, scientific, and management, and administrative and waste management services	869	+/-173	5.5%	+/-1.1
Educational services, and health care and social assistance	4,071	+/-326	26.0%	+/-1.8
Arts, entertainment, and recreation, and accommodation and food services	1,896	+/-272	12.1%	+/-1.7
Other services, except public administration	760	+/-143	4.8%	+/-0.9
Public administration	986	+/-202	6.3%	+/-1.3
CLASS OF WORKER				
Civilian employed population 16 years and over	15,682	+/-499	15,682	(X)
Private wage and salary workers	11,643	+/-491	74.2%	+/-2.3
Government workers	3,203	+/-359	20.4%	+/-2.2
Self-employed in own not incorporated business workers	815	+/-178	5.2%	+/-1.1
Unpaid family workers	21	+/-27	0.1%	+/-0.2
INCOME AND BENEFITS (IN 2016 INFLATION-ADJUSTED DOLLARS)				
Total households	14,990	+/-339	14,990	(X)
Less than \$10,000	1,907	+/-203	12.7%	+/-1.3
\$10,000 to \$14,999	1,100	+/-164	7.3%	+/-1.1
\$15,000 to \$24,999	2,205	+/-238	14.7%	+/-1.6
\$25,000 to \$34,999	2,144	+/-259	14.3%	+/-1.7
\$35,000 to \$49,999	1,966	+/-224	13.1%	+/-1.4
\$50,000 to \$74,999	2,761	+/-281	18.4%	+/-1.8
\$75,000 to \$99,999	1,317	+/-195	8.8%	+/-1.3
\$100,000 to \$149,999	1,055	+/-155	7.0%	+/-1.0
\$150,000 to \$199,999	365	+/-94	2.4%	+/-0.6
\$200,000 or more	170	+/-62	1.1%	+/-0.4
Median household income (dollars)	36,232	+/-2,420	(X)	(X)
Mean household income (dollars)	48,766	+/-1,789	(X)	(X)
With earnings	10,409	+/-326	69.4%	+/-1.9
Mean earnings (dollars)	51,577	+/-2,199	(X)	(X)
With Social Security	5,169	+/-296	34.5%	+/-1.7
Mean Social Security income (dollars)	16,170	+/-716	(X)	(X)
With retirement income	2,515	+/-213	16.8%	+/-1.4
Mean retirement income (dollars)	19,378	+/-2,051	(X)	(X)
With Supplemental Security Income	1,392	+/-198	9.3%	+/-1.3
Mean Supplemental Security Income (dollars)	9,054	+/-763	(X)	(X)
With cash public assistance income	685	+/-114	4.6%	+/-0.8
Mean cash public assistance income (dollars)	1,802	+/-545	(X)	(X)
With Food Stamp/SNAP benefits in the past 12 months	3,602	+/-277	24.0%	+/-1.8
Families	9,359	+/-309	9,359	(X)
Less than \$10,000	815	+/-143	8.7%	+/-1.5
\$10,000 to \$14,999	403	+/-104	4.3%	+/-1.1
\$15,000 to \$24,999	1,148	+/-185	12.3%	+/-1.9
\$25,000 to \$34,999	1,180	+/-204	12.6%	+/-2.1
\$35,000 to \$49,999	1,287	+/-190	13.8%	+/-1.9
\$50,000 to \$74,999	2,035	+/-255	21.7%	+/-2.7
\$75,000 to \$99,999	1,154	+/-212	12.3%	+/-2.2
\$100,000 to \$149,999	880	+/-139	9.4%	+/-1.5
\$150,000 to \$199,999	310	+/-90	3.3%	+/-1.0
\$200,000 or more	147	+/-57	1.6%	+/-0.6
Median family income (dollars)	47,373	+/-3,488	(X)	(X)
Mean family income (dollars)	58,186	+/-2,586	(X)	(X)
Per capita income (dollars)	19,695	+/-769	(X)	(X)
Nonfamily households	5,631	+/-368	5,631	(X)
Median nonfamily income (dollars)	21,435	+/-1,987	(X)	(X)
Mean nonfamily income (dollars)	30,772	+/-2,363	(X)	(X)
Median earnings for workers (dollars)	24,368	+/-1,458	(X)	(X)
Median earnings for male full-time, year-round workers (dollars)	38,281	+/-2,688	(X)	(X)
Median earnings for female full-time, year-round workers (dollars)	27,923	+/-1,470	(X)	(X)
HEALTH INSURANCE COVERAGE				
Civilian noninstitutionalized population	37,855	+/-198	37,855	(X)
With health insurance coverage	30,376	+/-571	80.2%	+/-1.5

Subject	Muskogee city, Oklahoma			
	Estimate	Margin of Error	Percent	Percent Margin of Error
With private health insurance	19,068	+/-701	50.4%	+/-1.9
With public coverage	15,793	+/-638	41.7%	+/-1.7
No health insurance coverage	7,479	+/-563	19.8%	+/-1.5
Civilian noninstitutionalized population under 18 years	9,985	+/-285	9,985	(X)
No health insurance coverage	1,337	+/-246	13.4%	+/-2.5
Civilian noninstitutionalized population 18 to 64 years	22,313	+/-311	22,313	(X)
In labor force:	15,774	+/-447	15,774	(X)
Employed:	14,638	+/-484	14,638	(X)
With health insurance coverage	11,062	+/-452	75.6%	+/-2.2
With private health insurance	10,117	+/-462	69.1%	+/-2.4
With public coverage	1,456	+/-206	9.9%	+/-1.4
No health insurance coverage	3,576	+/-362	24.4%	+/-2.2
Unemployed:	1,136	+/-190	1,136	(X)
With health insurance coverage	485	+/-131	42.7%	+/-10.5
With private health insurance	193	+/-60	17.0%	+/-5.3
With public coverage	299	+/-116	26.3%	+/-9.6
No health insurance coverage	651	+/-175	57.3%	+/-10.5
Not in labor force:	6,539	+/-379	6,539	(X)
With health insurance coverage	4,699	+/-318	71.9%	+/-3.2
With private health insurance	2,021	+/-206	30.9%	+/-3.1
With public coverage	3,114	+/-295	47.6%	+/-3.5
No health insurance coverage	1,840	+/-246	28.1%	+/-3.2
PERCENTAGE OF FAMILIES AND PEOPLE WHOSE INCOME IN THE PAST 12 MONTHS IS BELOW THE POVERTY LEVEL				
All families	(X)	(X)	18.8%	+/-2.4
With related children of the householder under 18 years	(X)	(X)	26.9%	+/-3.5
With related children of the householder under 5 years only	(X)	(X)	27.0%	+/-8.2
Married couple families	(X)	(X)	6.7%	+/-1.9
With related children of the householder under 18 years	(X)	(X)	9.2%	+/-3.0
With related children of the householder under 5 years only	(X)	(X)	1.9%	+/-2.9
Families with female householder, no husband present	(X)	(X)	45.2%	+/-5.9
With related children of the householder under 18 years	(X)	(X)	52.8%	+/-6.3
With related children of the householder under 5 years only	(X)	(X)	63.0%	+/-13.7
All people	(X)	(X)	23.6%	+/-2.1
Under 18 years	(X)	(X)	32.0%	+/-4.0
Related children of the householder under 18 years	(X)	(X)	31.4%	+/-4.0
Related children of the householder under 5 years	(X)	(X)	36.1%	+/-6.1
Related children of the householder 5 to 17 years	(X)	(X)	29.3%	+/-4.4
18 years and over	(X)	(X)	20.6%	+/-1.7
18 to 64 years	(X)	(X)	22.6%	+/-2.1
65 years and over	(X)	(X)	12.6%	+/-2.4
People in families	(X)	(X)	20.5%	+/-2.7
Unrelated individuals 15 years and over	(X)	(X)	35.4%	+/-3.3

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

Employment and unemployment estimates may vary from the official labor force data released by the Bureau of Labor Statistics because of differences in survey design and data collection. For guidance on differences in employment and unemployment estimates from different sources go to Labor Force Guidance.

Workers include members of the Armed Forces and civilians who were at work last week.

Occupation codes are 4-digit codes and are based on Standard Occupational Classification 2010.

Industry codes are 4-digit codes and are based on the North American Industry Classification System (NAICS). The Census industry codes for 2013 and later years are based on the 2012 revision of the NAICS. To allow for the creation of 2012-2016 tables, industry data in the multiyear files (2012-2016) were recoded to 2013 Census industry codes. We recommend using caution when comparing data coded using 2013 Census industry codes with data coded using Census industry codes prior to 2013. For more information on the Census industry code changes, please visit our website at <https://www.census.gov/people/io/methodology/>.

Logical coverage edits applying a rules-based assignment of Medicaid, Medicare and military health coverage were added as of 2009 -- please see [https://www.census.gov/library/working-papers/2010/demo/coverage\\_edits\\_final.html](https://www.census.gov/library/working-papers/2010/demo/coverage_edits_final.html) for more details. The 2008 data table in American FactFinder does not incorporate these edits. Therefore, the estimates that appear in these tables are not comparable

to the estimates in the 2009 and later tables. Select geographies of 2008 data comparable to the 2009 and later tables are available at <https://www.census.gov/data/tables/time-series/acs/1-year-re-run-health-insurance.html>. The health insurance coverage category names were modified in 2010. See [https://www.census.gov/topics/health/health-insurance/about/glossary.html#par\\_textimage\\_18](https://www.census.gov/topics/health/health-insurance/about/glossary.html#par_textimage_18) for a list of the insurance type definitions.

While the 2012-2016 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural population, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

#### Explanation of Symbols:

1. An '\*\*\*' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '\*\*\*' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '\*\*\*\*\*' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.



DP03

## SELECTED ECONOMIC CHARACTERISTICS

2012-2016 American Community Survey 5-Year Estimates

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Data and Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

**Tell us what you think.** Provide feedback to help make American Community Survey data more useful for you.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

Subject	Oklahoma			
	Estimate	Margin of Error	Percent	Percent Margin of Error
<b>EMPLOYMENT STATUS</b>				
Population 16 years and over	3,025,259	+/-962	3,025,259	(X)
In labor force	1,861,235	+/-3,953	61.5%	+/-0.1
Civilian labor force	1,843,120	+/-3,788	60.9%	+/-0.1
Employed	1,733,000	+/-3,688	57.3%	+/-0.1
Unemployed	110,120	+/-2,114	3.6%	+/-0.1
Armed Forces	18,115	+/-698	0.6%	+/-0.1
Not in labor force	1,164,024	+/-3,924	38.5%	+/-0.1
Civilian labor force	1,843,120	+/-3,788	1,843,120	(X)
Unemployment Rate	(X)	(X)	6.0%	+/-0.1
Females 16 years and over	1,539,472	+/-776	1,539,472	(X)
In labor force	858,245	+/-3,158	55.7%	+/-0.2
Civilian labor force	855,207	+/-3,125	55.6%	+/-0.2
Employed	803,567	+/-3,106	52.2%	+/-0.2
Own children of the householder under 6 years	303,691	+/-1,602	303,691	(X)
All parents in family in labor force	187,999	+/-2,405	61.9%	+/-0.7
Own children of the householder 6 to 17 years	586,167	+/-1,615	586,167	(X)
All parents in family in labor force	401,071	+/-2,984	68.4%	+/-0.5
<b>COMMUTING TO WORK</b>				
Workers 16 years and over	1,720,575	+/-3,990	1,720,575	(X)
Car, truck, or van -- drove alone	1,421,560	+/-4,306	82.6%	+/-0.2
Car, truck, or van -- carpooled	174,034	+/-3,203	10.1%	+/-0.2
Public transportation (excluding taxicab)	7,924	+/-575	0.5%	+/-0.1
Walked	30,297	+/-1,113	1.8%	+/-0.1
Other means	24,007	+/-963	1.4%	+/-0.1
Worked at home	62,753	+/-1,682	3.6%	+/-0.1
Mean travel time to work (minutes)	21.4	+/-0.1	(X)	(X)
<b>OCCUPATION</b>				
Civilian employed population 16 years and over	1,733,000	+/-3,688	1,733,000	(X)
Management, business, science, and arts occupations	580,967	+/-3,887	33.5%	+/-0.2
Service occupations	304,963	+/-3,484	17.6%	+/-0.2
Sales and office occupations	417,622	+/-3,497	24.1%	+/-0.2
Natural resources, construction, and maintenance occupations	199,941	+/-2,431	11.5%	+/-0.1
Production, transportation, and material moving occupations	229,507	+/-2,347	13.2%	+/-0.1
<b>INDUSTRY</b>				
Civilian employed population 16 years and over	1,733,000	+/-3,688	1,733,000	(X)
Agriculture, forestry, fishing and hunting, and mining	89,125	+/-1,758	5.1%	+/-0.1
Construction	123,310	+/-1,984	7.1%	+/-0.1
Manufacturing	170,162	+/-2,203	9.8%	+/-0.1
Wholesale trade	45,320	+/-1,097	2.6%	+/-0.1

Subject	Oklahoma			
	Estimate	Margin of Error	Percent	Percent Margin of Error
Retail trade	200,829	+/-2,634	11.6%	+/-0.2
Transportation and warehousing, and utilities	88,125	+/-1,471	5.1%	+/-0.1
Information	30,788	+/-1,107	1.8%	+/-0.1
Finance and insurance, and real estate and rental and leasing	96,671	+/-1,858	5.6%	+/-0.1
Professional, scientific, and management, and administrative and waste management services	141,193	+/-2,066	8.1%	+/-0.1
Educational services, and health care and social assistance	388,814	+/-3,512	22.4%	+/-0.2
Arts, entertainment, and recreation, and accommodation and food services	161,513	+/-2,355	9.3%	+/-0.1
Other services, except public administration	89,964	+/-1,983	5.2%	+/-0.1
Public administration	107,186	+/-1,695	6.2%	+/-0.1
CLASS OF WORKER				
Civilian employed population 16 years and over	1,733,000	+/-3,688	1,733,000	(X)
Private wage and salary workers	1,330,375	+/-4,005	76.8%	+/-0.2
Government workers	292,206	+/-2,955	16.9%	+/-0.2
Self-employed in own not incorporated business workers	106,952	+/-1,910	6.2%	+/-0.1
Unpaid family workers	3,467	+/-373	0.2%	+/-0.1
INCOME AND BENEFITS (IN 2016 INFLATION-ADJUSTED DOLLARS)				
Total households	1,461,500	+/-3,382	1,461,500	(X)
Less than \$10,000	113,663	+/-1,733	7.8%	+/-0.1
\$10,000 to \$14,999	86,545	+/-1,339	5.9%	+/-0.1
\$15,000 to \$24,999	171,639	+/-2,148	11.7%	+/-0.1
\$25,000 to \$34,999	166,451	+/-2,166	11.4%	+/-0.1
\$35,000 to \$49,999	215,266	+/-2,319	14.7%	+/-0.2
\$50,000 to \$74,999	275,023	+/-2,559	18.8%	+/-0.2
\$75,000 to \$99,999	170,992	+/-2,150	11.7%	+/-0.1
\$100,000 to \$149,999	161,209	+/-2,284	11.0%	+/-0.2
\$150,000 to \$199,999	52,222	+/-1,306	3.6%	+/-0.1
\$200,000 or more	48,490	+/-1,141	3.3%	+/-0.1
Median household income (dollars)	48,038	+/-247	(X)	(X)
Mean household income (dollars)	65,458	+/-349	(X)	(X)
With earnings	1,120,436	+/-3,845	76.7%	+/-0.2
Mean earnings (dollars)	66,696	+/-389	(X)	(X)
With Social Security	455,358	+/-1,937	31.2%	+/-0.1
Mean Social Security income (dollars)	17,542	+/-66	(X)	(X)
With retirement income	252,957	+/-2,306	17.3%	+/-0.2
Mean retirement income (dollars)	21,161	+/-298	(X)	(X)
With Supplemental Security Income	82,554	+/-1,272	5.6%	+/-0.1
Mean Supplemental Security Income (dollars)	9,565	+/-91	(X)	(X)
With cash public assistance income	45,251	+/-1,201	3.1%	+/-0.1
Mean cash public assistance income (dollars)	2,040	+/-81	(X)	(X)
With Food Stamp/SNAP benefits in the past 12 months	199,662	+/-2,272	13.7%	+/-0.1
Families	967,783	+/-3,592	967,783	(X)
Less than \$10,000	48,626	+/-1,197	5.0%	+/-0.1
\$10,000 to \$14,999	31,316	+/-909	3.2%	+/-0.1
\$15,000 to \$24,999	84,553	+/-1,462	8.7%	+/-0.1
\$25,000 to \$34,999	96,020	+/-1,648	9.9%	+/-0.2
\$35,000 to \$49,999	139,253	+/-2,192	14.4%	+/-0.2
\$50,000 to \$74,999	201,990	+/-2,475	20.9%	+/-0.2
\$75,000 to \$99,999	138,713	+/-2,000	14.3%	+/-0.2
\$100,000 to \$149,999	138,166	+/-2,152	14.3%	+/-0.2
\$150,000 to \$199,999	46,039	+/-1,169	4.8%	+/-0.1
\$200,000 or more	43,107	+/-1,151	4.5%	+/-0.1
Median family income (dollars)	59,742	+/-358	(X)	(X)
Mean family income (dollars)	77,212	+/-491	(X)	(X)
Per capita income (dollars)	25,628	+/-132	(X)	(X)
Nonfamily households	493,717	+/-3,500	493,717	(X)
Median nonfamily income (dollars)	28,082	+/-275	(X)	(X)
Mean nonfamily income (dollars)	39,659	+/-415	(X)	(X)
Median earnings for workers (dollars)	29,038	+/-215	(X)	(X)
Median earnings for male full-time, year-round workers (dollars)	44,120	+/-392	(X)	(X)
Median earnings for female full-time, year-round workers (dollars)	32,661	+/-250	(X)	(X)
HEALTH INSURANCE COVERAGE				
Civilian noninstitutionalized population	3,794,815	+/-670	3,794,815	(X)
With health insurance coverage	3,200,667	+/-5,976	84.3%	+/-0.2

Subject	Oklahoma			
	Estimate	Margin of Error	Percent	Percent Margin of Error
With private health insurance	2,396,219	+/-8,520	63.1%	+/-0.2
With public coverage	1,263,489	+/-6,321	33.3%	+/-0.2
No health insurance coverage	594,148	+/-6,028	15.7%	+/-0.2
Civilian noninstitutionalized population under 18 years	950,318	+/-302	950,318	(X)
No health insurance coverage	81,357	+/-2,298	8.6%	+/-0.2
Civilian noninstitutionalized population 18 to 64 years	2,301,565	+/-1,077	2,301,565	(X)
In labor force:	1,714,862	+/-3,543	1,714,862	(X)
Employed:	1,613,542	+/-3,532	1,613,542	(X)
With health insurance coverage	1,307,567	+/-5,055	81.0%	+/-0.2
With private health insurance	1,247,388	+/-5,137	77.3%	+/-0.2
With public coverage	101,644	+/-2,099	6.3%	+/-0.1
No health insurance coverage	305,975	+/-3,646	19.0%	+/-0.2
Unemployed:	101,320	+/-2,072	101,320	(X)
With health insurance coverage	48,161	+/-1,307	47.5%	+/-0.9
With private health insurance	31,091	+/-998	30.7%	+/-0.8
With public coverage	19,145	+/-829	18.9%	+/-0.7
No health insurance coverage	53,159	+/-1,495	52.5%	+/-0.9
Not in labor force:	586,703	+/-3,648	586,703	(X)
With health insurance coverage	436,316	+/-3,164	74.4%	+/-0.4
With private health insurance	274,696	+/-2,976	46.8%	+/-0.4
With public coverage	200,624	+/-2,486	34.2%	+/-0.4
No health insurance coverage	150,387	+/-2,407	25.6%	+/-0.4
PERCENTAGE OF FAMILIES AND PEOPLE WHOSE INCOME IN THE PAST 12 MONTHS IS BELOW THE POVERTY LEVEL				
All families	(X)	(X)	12.2%	+/-0.2
With related children of the householder under 18 years	(X)	(X)	19.5%	+/-0.4
With related children of the householder under 5 years only	(X)	(X)	21.5%	+/-0.8
Married couple families	(X)	(X)	6.0%	+/-0.2
With related children of the householder under 18 years	(X)	(X)	8.8%	+/-0.3
With related children of the householder under 5 years only	(X)	(X)	7.7%	+/-0.6
Families with female householder, no husband present	(X)	(X)	34.7%	+/-0.6
With related children of the householder under 18 years	(X)	(X)	44.3%	+/-0.8
With related children of the householder under 5 years only	(X)	(X)	53.5%	+/-1.8
All people	(X)	(X)	16.5%	+/-0.2
Under 18 years	(X)	(X)	23.1%	+/-0.5
Related children of the householder under 18 years	(X)	(X)	22.7%	+/-0.5
Related children of the householder under 5 years	(X)	(X)	26.4%	+/-0.7
Related children of the householder 5 to 17 years	(X)	(X)	21.3%	+/-0.5
18 years and over	(X)	(X)	14.3%	+/-0.2
18 to 64 years	(X)	(X)	15.6%	+/-0.2
65 years and over	(X)	(X)	8.9%	+/-0.2
People in families	(X)	(X)	13.7%	+/-0.2
Unrelated individuals 15 years and over	(X)	(X)	28.7%	+/-0.4

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

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Workers include members of the Armed Forces and civilians who were at work last week.

Occupation codes are 4-digit codes and are based on Standard Occupational Classification 2010.

Industry codes are 4-digit codes and are based on the North American Industry Classification System (NAICS). The Census industry codes for 2013 and later years are based on the 2012 revision of the NAICS. To allow for the creation of 2012-2016 tables, industry data in the multiyear files (2012-2016) were recoded to 2013 Census industry codes. We recommend using caution when comparing data coded using 2013 Census industry codes with data coded using Census industry codes prior to 2013. For more information on the Census industry code changes, please visit our website at <https://www.census.gov/people/io/methodology/>.

Logical coverage edits applying a rules-based assignment of Medicaid, Medicare and military health coverage were added as of 2009 -- please see [https://www.census.gov/library/working-papers/2010/demo/coverage\\_edits\\_final.html](https://www.census.gov/library/working-papers/2010/demo/coverage_edits_final.html) for more details. The 2008 data table in American FactFinder does not incorporate these edits. Therefore, the estimates that appear in these tables are not comparable



to the estimates in the 2009 and later tables. Select geographies of 2008 data comparable to the 2009 and later tables are available at <https://www.census.gov/data/tables/time-series/acs/1-year-re-run-health-insurance.html>. The health insurance coverage category names were modified in 2010. See [https://www.census.gov/topics/health/health-insurance/about/glossary.html#par\\_textimage\\_18](https://www.census.gov/topics/health/health-insurance/about/glossary.html#par_textimage_18) for a list of the insurance type definitions.

While the 2012-2016 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural population, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

#### Explanation of Symbols:

1. An '\*\*\*' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '\*\*\*' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '\*\*\*\*\*' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.

## Reference 7

Welcome, Kelsey Bufford!  
kelsey.bufford@deq.ok.gov

Public Imaging Portal

Downloads

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All data in the provided downloads is taken from the PST database. Data from that system was last published for the public on the date provided in the download details under the heading "Data published as of". All published content is current as of today's date.

## Downloads

### Download OCC\_PST\_AllTanks.csv

**File Type:** CSV (Comma Separated Values) Text File

**File Size:** About 15MB

**Download Time:** About 30 seconds

**Data published as of:** 5/28/2018

**Document Notes:** This text file is a complete list of all tanks in Oklahoma registered with the OCC. This list does not include historical facilities.

A facility will be listed more than once in this spreadsheet due to the nature of the related tank information. A facility can have multiple tank types, multiple tank/pipe material and construction, etc. That related information is represented in a new row in the spreadsheet for the same facility.

*The facility number is enclosed in square brackets. This is to ensure that leading zeros are present when opening this type of file in Excel.*

### Download OCC\_PST\_OtherFacilities.csv

**File Type:** CSV (Comma Separated Values) Text File

**File Size:** About 5MB

**Download Time:** About 30 seconds

**Data published as of:** 5/28/2018

**Document Notes:** This text file is a list of Oklahoma facilities that *are not associated* with any registered tanks (i.e., historical facilities, brand new facilities awaiting tank installation, etc).

*The facility number is enclosed in square brackets. This is to ensure that leading zeros are present when opening this type of file in Excel.*

### Download OCC\_PST\_AllCases.xls

**File Type:** Microsoft Excel Spreadsheet

## Reference 8



DP-1

Profile of General Population and Housing Characteristics: 2010

2010 Demographic Profile Data

NOTE: For more information on confidentiality protection, nonsampling error, and definitions, see <http://www.census.gov/prod/cen2010/doc/dpsf.pdf>.

## Geography: Muskogee city, Oklahoma

Subject	Number	Percent
<b>SEX AND AGE</b>		
Total population	39,223	100.0
Under 5 years	3,007	7.7
5 to 9 years	2,802	7.1
10 to 14 years	2,603	6.6
15 to 19 years	2,685	6.8
20 to 24 years	2,820	7.2
25 to 29 years	2,784	7.1
30 to 34 years	2,461	6.3
35 to 39 years	2,218	5.7
40 to 44 years	2,114	5.4
45 to 49 years	2,544	6.5
50 to 54 years	2,693	6.9
55 to 59 years	2,430	6.2
60 to 64 years	2,197	5.6
65 to 69 years	1,616	4.1
70 to 74 years	1,241	3.2
75 to 79 years	1,155	2.9
80 to 84 years	923	2.4
85 years and over	930	2.4
Median age (years)	36.0	( X )
16 years and over	30,288	77.2
18 years and over	29,290	74.7
21 years and over	27,543	70.2
62 years and over	7,141	18.2
65 years and over	5,865	15.0
<b>Male population</b>		
Under 5 years	1,526	3.9
5 to 9 years	1,394	3.6
10 to 14 years	1,300	3.3
15 to 19 years	1,400	3.6
20 to 24 years	1,433	3.7
25 to 29 years	1,349	3.4
30 to 34 years	1,207	3.1
35 to 39 years	1,131	2.9
40 to 44 years	990	2.5
45 to 49 years	1,211	3.1
50 to 54 years	1,286	3.3
55 to 59 years	1,147	2.9
60 to 64 years	1,046	2.7
65 to 69 years	713	1.8
70 to 74 years	504	1.3
75 to 79 years	455	1.2
80 to 84 years	349	0.9
85 years and over	266	0.7
Median age (years)	33.9	( X )
16 years and over	14,216	36.2
18 years and over	13,718	35.0
21 years and over	12,763	32.5
62 years and over	2,907	7.4
65 years and over	2,287	5.8
<b>Female population</b>		
Under 5 years	1,481	3.8
5 to 9 years	1,408	3.6
10 to 14 years	1,303	3.3

Subject	Number	Percent
15 to 19 years	1,285	3.3
20 to 24 years	1,387	3.5
25 to 29 years	1,435	3.7
30 to 34 years	1,254	3.2
35 to 39 years	1,087	2.8
40 to 44 years	1,124	2.9
45 to 49 years	1,333	3.4
50 to 54 years	1,407	3.6
55 to 59 years	1,283	3.3
60 to 64 years	1,151	2.9
65 to 69 years	903	2.3
70 to 74 years	737	1.9
75 to 79 years	700	1.8
80 to 84 years	574	1.5
85 years and over	664	1.7
Median age (years)	38.3	( X )
16 years and over	16,072	41.0
18 years and over	15,572	39.7
21 years and over	14,780	37.7
62 years and over	4,234	10.8
65 years and over	3,578	9.1
RACE		
Total population	39,223	100.0
One Race	36,051	91.9
White	21,926	55.9
Black or African American	6,311	16.1
American Indian and Alaska Native	6,017	15.3
Asian	335	0.9
Asian Indian	55	0.1
Chinese	47	0.1
Filipino	45	0.1
Japanese	12	0.0
Korean	22	0.1
Vietnamese	120	0.3
Other Asian [1]	34	0.1
Native Hawaiian and Other Pacific Islander	15	0.0
Native Hawaiian	7	0.0
Guamanian or Chamorro	8	0.0
Samoa	0	0.0
Other Pacific Islander [2]	0	0.0
Some Other Race	1,447	3.7
Two or More Races	3,172	8.1
White; American Indian and Alaska Native [3]	1,881	4.8
White; Asian [3]	34	0.1
White; Black or African American [3]	355	0.9
White; Some Other Race [3]	125	0.3
Race alone or in combination with one or more other races: [4]		
White	24,536	62.6
Black or African American	7,320	18.7
American Indian and Alaska Native	8,610	22.0
Asian	418	1.1
Native Hawaiian and Other Pacific Islander	42	0.1
Some Other Race	1,684	4.3
HISPANIC OR LATINO		
Total population	39,223	100.0
Hispanic or Latino (of any race)	2,781	7.1
Mexican	2,252	5.7
Puerto Rican	84	0.2
Cuban	15	0.0
Other Hispanic or Latino [5]	430	1.1
Not Hispanic or Latino	36,442	92.9
HISPANIC OR LATINO AND RACE		
Total population	39,223	100.0
Hispanic or Latino	2,781	7.1
White alone	807	2.1
Black or African American alone	57	0.1
American Indian and Alaska Native alone	171	0.4
Asian alone	11	0.0
Native Hawaiian and Other Pacific Islander alone	2	0.0
Some Other Race alone	1,433	3.7
Two or More Races	300	0.8
Not Hispanic or Latino	36,442	92.9

Subject	Number	Percent
White alone	21,119	53.8
Black or African American alone	6,254	15.9
American Indian and Alaska Native alone	5,846	14.9
Asian alone	324	0.8
Native Hawaiian and Other Pacific Islander alone	13	0.0
Some Other Race alone	14	0.0
Two or More Races	2,872	7.3
RELATIONSHIP		
Total population	39,223	100.0
In households	37,870	96.6
Householder	15,704	40.0
Spouse [6]	6,265	16.0
Child	10,776	27.5
Own child under 18 years	8,189	20.9
Other relatives	3,002	7.7
Under 18 years	1,415	3.6
65 years and over	291	0.7
Nonrelatives	2,123	5.4
Under 18 years	224	0.6
65 years and over	86	0.2
Unmarried partner	1,008	2.6
In group quarters	1,353	3.4
Institutionalized population	834	2.1
Male	455	1.2
Female	379	1.0
Noninstitutionalized population	519	1.3
Male	342	0.9
Female	177	0.5
HOUSEHOLDS BY TYPE		
Total households	15,704	100.0
Family households (families) [7]	9,761	62.2
With own children under 18 years	4,339	27.6
Husband-wife family	6,265	39.9
With own children under 18 years	2,423	15.4
Male householder, no wife present	778	5.0
With own children under 18 years	394	2.5
Female householder, no husband present	2,718	17.3
With own children under 18 years	1,522	9.7
Nonfamily households [7]	5,943	37.8
Householder living alone	5,140	32.7
Male	2,132	13.6
65 years and over	545	3.5
Female	3,008	19.2
65 years and over	1,495	9.5
Households with individuals under 18 years	5,087	32.4
Households with individuals 65 years and over	4,335	27.6
Average household size	2.41	( X )
Average family size [7]	3.05	( X )
HOUSING OCCUPANCY		
Total housing units	18,055	100.0
Occupied housing units	15,704	87.0
Vacant housing units	2,351	13.0
For rent	663	3.7
Rented, not occupied	38	0.2
For sale only	274	1.5
Sold, not occupied	106	0.6
For seasonal, recreational, or occasional use	65	0.4
All other vacants	1,205	6.7
Homeowner vacancy rate (percent) [8]	2.9	( X )
Rental vacancy rate (percent) [9]	9.0	( X )
HOUSING TENURE		
Occupied housing units	15,704	100.0
Owner-occupied housing units	9,062	57.7
Population in owner-occupied housing units	22,506	( X )
Average household size of owner-occupied units	2.48	( X )
Renter-occupied housing units	6,642	42.3
Population in renter-occupied housing units	15,364	( X )
Average household size of renter-occupied units	2.31	( X )

X Not applicable.

[1] Other Asian alone, or two or more Asian categories.

[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.

[3] One of the four most commonly reported multiple-race combinations nationwide in Census 2000.

[4] In combination with one or more of the other races listed. The six numbers may add to more than the total population, and the six percentages may add to more than 100 percent because individuals may report more than one race.

[5] This category is composed of people whose origins are from the Dominican Republic, Spain, and Spanish-speaking Central or South American countries. It also includes general origin responses such as "Latino" or "Hispanic."

[6] "Spouse" represents spouse of the householder. It does not reflect all spouses in a household. Responses of "same-sex spouse" were edited during processing to "unmarried partner."

[7] "Family households" consist of a householder and one or more other people related to the householder by birth, marriage, or adoption. They do not include same-sex married couples even if the marriage was performed in a state issuing marriage certificates for same-sex couples. Same-sex couple households are included in the family households category if there is at least one additional person related to the householder by birth or adoption. Same-sex couple households with no relatives of the householder present are tabulated in nonfamily households. "Nonfamily households" consist of people living alone and households which do not have any members related to the householder.

[8] The homeowner vacancy rate is the proportion of the homeowner inventory that is vacant "for sale." It is computed by dividing the total number of vacant units "for sale only" by the sum of owner-occupied units, vacant units that are "for sale only," and vacant units that have been sold but not yet occupied; and then multiplying by 100.

[9] The rental vacancy rate is the proportion of the rental inventory that is vacant "for rent." It is computed by dividing the total number of vacant units "for rent" by the sum of the renter-occupied units, vacant units that are "for rent," and vacant units that have been rented but not yet occupied; and then multiplying by 100.

Source: U.S. Census Bureau, 2010 Census.



## Reference 9

This map is for use in administering the National Flood Insurance Program. It does not constitute a contract. The community may request that the information be considered for possible updates or additional flood hazard information.

**Coastal Base Flood Elevations (BFEs)** shown on this map apply only to landward of 0.5 miles North American Vertical Datum of 1985 (NAVD 85). Users of this FEMA should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this Flood

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Lambert Conformal Conic, Oklahoma State Plane Coordinate System (NAD 83), Zone 10. The horizontal datum was NAD83. UTM 18QD (1983) period. Differences in datum, sponsored projection and datum used in the preparation of this map and other maps may result in slight coordinate offsets in some features, especially along boundaries.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geologic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geospatial Survey website at <http://n2t.ms.cim.nps.gov> or contact the National Geologic Survey at the following: 1225 Linn Street, St. Louis, MO 63103.

NC25 Information Services  
 NOAA, NNG3512  
 National Oceanic Survey  
 SSAC-3, #6202  
 1315 East-West Highway  
 Silver Spring, Maryland 20910-5262  
 301/713-3242

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodway data were derived from the previous FIRM. The data were adjusted to reflect the more detailed stream channel configurations shown on this map. The Flood Insurance Study (FIS) data were derived from the Flood Insurance Study (FIS) data. The Flood Insurance Study (FIS) data were derived from the Flood Insurance Study (FIS) data.

**Corporate limits** shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate corporate officials to verify current corporate limit locations.

Contact the FEMA Map Service Center at 1-877-FEMA-5000 (1-877-336-2027) for information on available products associated with this FEMA. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://www.fema.gov>.

If you have questions about this map, or would like to purchase a hard copy, please call 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/disaster/mfip/>.

TABLE 1  
Summary of the characteristics of the 100 subjects who were included in the study

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[illegible]

## Reference 10



theoklahomawaterresourcesboard

thewateragency

Board Meetings | Rules | Forms | FAQ | Reports | OCWP | About Us | News



Water Use Permitting

Financial Assistance

Well Drilling

Water Quality Standards

Monitoring & Assessment

Groundwater Studies

Surface Water Studies

Dam Safety

Floodplain Management

Drought Monitoring

Interactive Maps & Data

Sign up for the latest news  
and updates from the OWRB.

Email Address

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## Interactive Maps & GIS Data



OWRB General Viewer



Groundwater in Oklahoma



Dam Inventory



Fish Monitoring Sites

All OWRB Data

Aquifer Study Data

Bathymetric Data

Floodplain Data (FEMA)

Groundwater Data

Oklahoma Comprehensive  
Water Plan Data

Surface Water Data

Water Rights Data

Water Supply Data

### Hydrologic Study Maps

Arbuckle-Simpson

Canadian River

Garber-Wellington

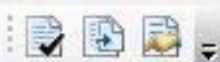
Nork Fork of the Red River

ArcCatalog - K:\LPD GIS Data\Downham\PASI\FMRI\Surface Water Intakes

File Edit View Go Geoprocessing Customize Windows Help





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Catalog Tree

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K:\LPD GIS Data\Downham\PASI\FMRI\Surface Water In  
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abase Connections  
Servers  
Hosted Services  
dy-To-Use Services  
cking Connections

Contents Preview Description

Name	Type
 Permitted_Surface_Water_Diversion_Points.shp	Shapefile
 Permitted_Surface_Water_Diversion_Points.xml	XML Document

## Reference 11

**IPaC** Information for Planning and Consultation **U.S. Fish & Wildlife Service**

## IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

### Location

Muskogee County, Oklahoma



### Local office

Oklahoma Ecological Services Field Office

☎ (918) 581-7458

📠 (918) 581-7467

9014 East 21st Street

Tulsa, OK 74129-1428

<http://www.fws.gov/southwest/es/Oklahoma/>



# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

## Listed species

<sup>1</sup> and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries<sup>2</sup>).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.
2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:



## Mammals

NAME	STATUS
<b>Gray Bat</b> <i>Myotis grisescens</i> No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/6329">https://ecos.fws.gov/ecp/species/6329</a>	Endangered
<b>Northern Long-eared Bat</b> <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/9045">https://ecos.fws.gov/ecp/species/9045</a>	Threatened

## Birds

NAME	STATUS
<b>Least Tern</b> <i>Sterna antillarum</i> No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/8505">https://ecos.fws.gov/ecp/species/8505</a>	Endangered
<b>Piping Plover</b> <i>Charadrius melodus</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. <a href="https://ecos.fws.gov/ecp/species/6039">https://ecos.fws.gov/ecp/species/6039</a>	Threatened
<b>Red Knot</b> <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/1864">https://ecos.fws.gov/ecp/species/1864</a>	Threatened
<b>Whooping Crane</b> <i>Grus americana</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. <a href="https://ecos.fws.gov/ecp/species/758">https://ecos.fws.gov/ecp/species/758</a>	Endangered

## Insects

NAME	STATUS
<b>American Burying Beetle</b> <i>Nicrophorus americanus</i> No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/66">https://ecos.fws.gov/ecp/species/66</a>	Endangered

## Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

# Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act

<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE")

INDICATES THAT THE BIRD DOES  
NOT LIKELY BREED IN YOUR  
PROJECT AREA.)

#### American Golden-plover *Pluvialis dominica*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds elsewhere

#### Bald Eagle *Haliaeetus leucocephalus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds Oct 15 to Aug 31

#### Prothonotary Warbler *Protonotaria citrea*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds Apr 1 to Jul 31

#### Red-headed Woodpecker *Melanerpes erythrocephalus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 10 to Sep 10

## Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

### Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is  $0.25/0.25 = 1$ ; at week 20 it is  $0.05/0.25 = 0.2$ .

- The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

### Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

### Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

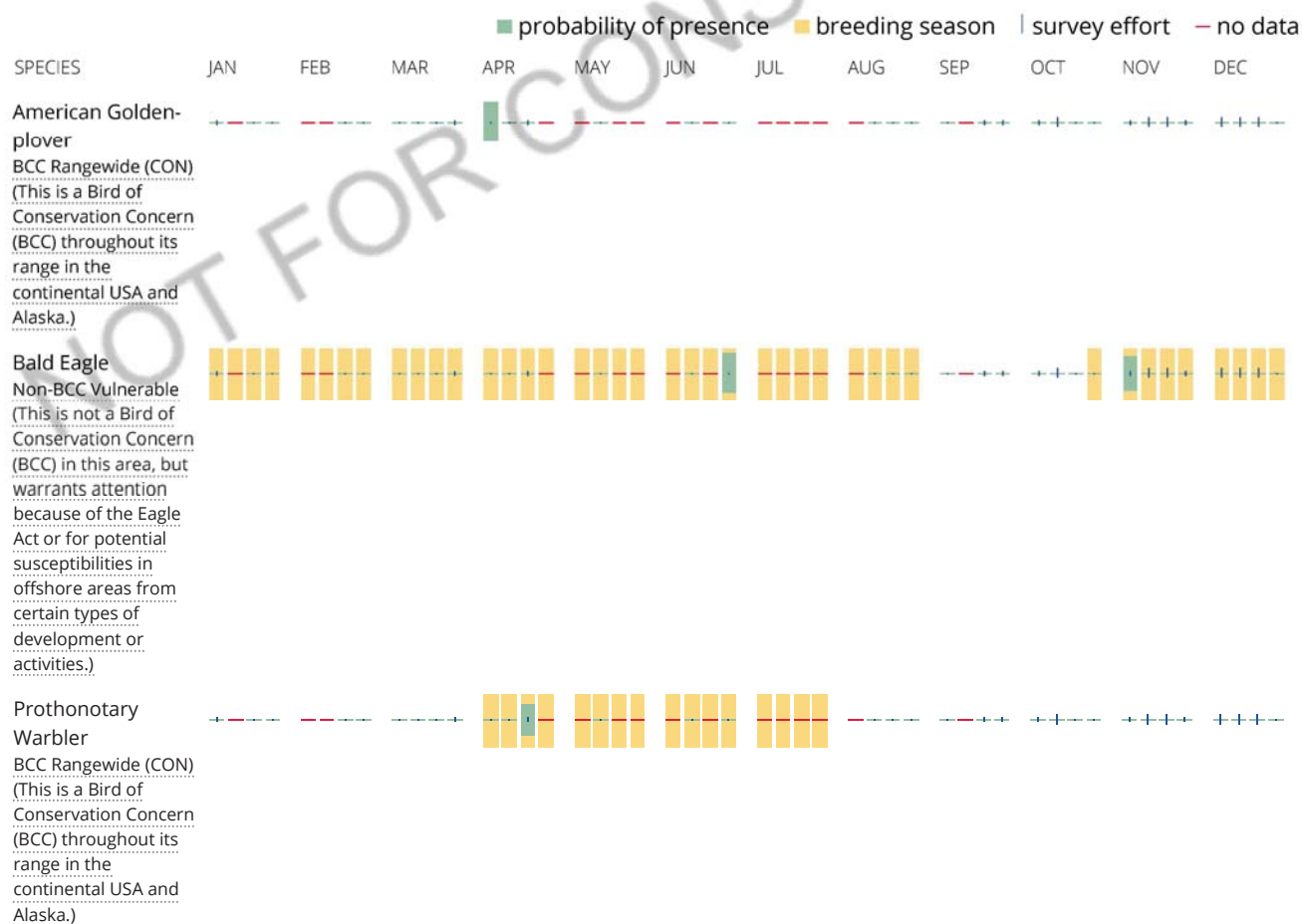
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

### No Data (—)

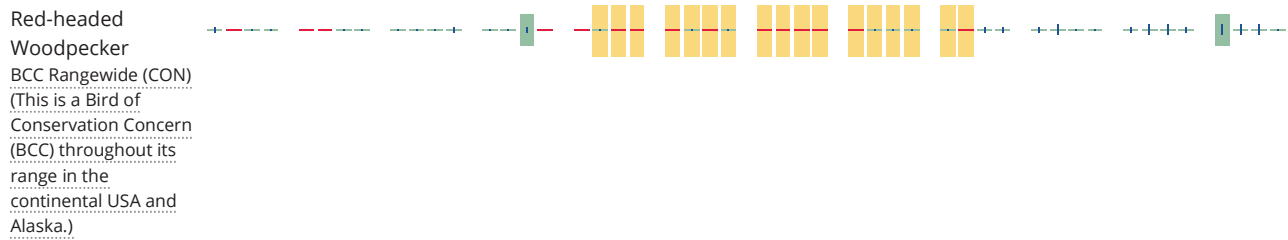
A week is marked as having no data if there were no survey events for that week.

### Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.







**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the migratory birds potentially occurring in my specified location?**

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [E-bird Explore Data Tool](#).

**What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

**How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

**What are the levels of concern for migratory birds?**

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

### Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

### What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

### Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

## Facilities

## Wildlife refuges and fish hatcheries

REFUGE AND FISH HATCHERY INFORMATION IS NOT AVAILABLE AT THIS TIME

## Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER POND

[PUBHx](#)

A full description for each wetland code can be found at the [National Wetlands Inventory website](#)

### Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

### Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

### Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION



## Reference 12



SCOTT A. THOMPSON  
Executive Director

OKLAHOMA DEPARTMENT OF  
ENVIRONMENTAL QUALITY

MARY FALLIN  
Governor

May 16, 2018

Dr. Todd Fagin  
ONHI Biotics Administrator  
Oklahoma Natural Heritage Inventory  
111 East Chesapeake Street  
Norman, OK 73019-0575

Dear Dr. Fagin,

The purpose of this letter is to request information regarding ecological systems of importance within a 4-mile radius of the site and 15 miles (approximately 35.63296944 N and -95.27277778 W) downstream of the surface water entry of the site listed on the attached page.

The project site is referred to as the former Fansteel Metals site. It is an industrial site that formally processed tantalum and columbium ore into bars which were then melted into ingots. The site has operated since approximately the late 1950s. The information provided by your office will be used partly to describe sensitive environments in a site assessment conducted by the DEQ (Site Assessment Unit), as authorized by a cooperative agreement with the U.S. Environmental Protection Agency.

Your assistance is greatly appreciated. If you have any questions, please contact me at (405) 702-5184 or [kelsey.bufford@deq.ok.gov](mailto:kelsey.bufford@deq.ok.gov).

Sincerely,

A handwritten signature in black ink that reads "Kelsey Bufford". The signature is written in a cursive style with a large, looped "K" and a long, trailing "f".

Kelsey Bufford  
Environmental Programs Specialist  
Land Protection Division

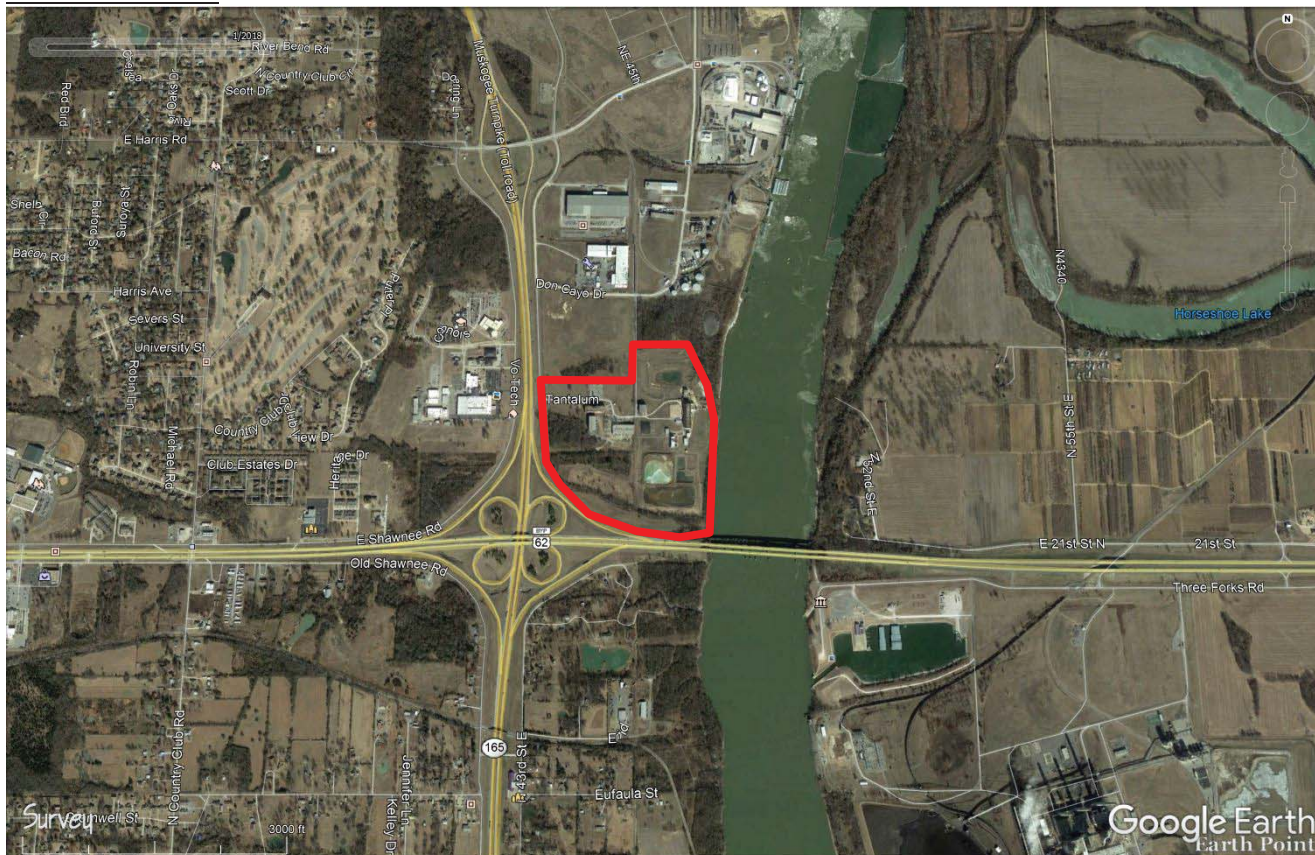
Attachment

### Site Location:

SITE NAME	Street	City	Zip Code	COUNTY
Fansteel Metals	10 Tantalum Place	Muskogee	74403	Muskogee

Latitude	Longitude
35.775183	-95.306763

### Site Boundaries:



### Radius of Interest:

Site Name	Sections	Township	Range	County
FMRI	1, 11-14, 23-26, 36	15N	18E	Muskogee
FMRI	13, 23, 24	14N	19E	Muskogee
FMRI	2-35	15N	19E	Muskogee
FMRI	6, 7, 18, 30, 31	14N	20E	Muskogee
FMRI	30, 31	15N	20E	Muskogee
FMRI	31-35	16N	19E	Wagoner

OBS Ref. 2018-300-STA-DEQ

Dear Ms. Bufford,

May 16, 2018

We have reviewed occurrence information on federal and state threatened, endangered or candidate species, as well as non-regulatory rare species and ecological systems of importance currently in the Oklahoma Natural Heritage Inventory database for the following location you provided:

Sec. 17-T15N-R19E (-95.306763, 35.775183), Muskogee County

We found 29 occurrence(s) of relevant species within the vicinity of the project location as described.

See table 1 on page 2

Additionally, absence from our database does not preclude such species from occurring in the area.

If you have any questions about this response, please send me an email, or call us at the number given below.

Although not specific to your project, you may find the following links helpful.

ONHI, guide to ranking codes for endangered and threatened species:  
[http://vmpincel.ou.edu/heritage/ranking\\_guide.html](http://vmpincel.ou.edu/heritage/ranking_guide.html)

Information regarding the Oklahoma Natural Areas Registry:  
[http://www.oknaturalheritage.ou.edu/registry\\_faq.htm](http://www.oknaturalheritage.ou.edu/registry_faq.htm)

Todd Fagin  
Oklahoma Natural Heritage Inventory  
(405) 325-4700  
[tfagin@ou.edu](mailto:tfagin@ou.edu)

**Table 1.** Occurrences in the project vicinity

<b>Species Name</b>	<b>Common Name</b>	<b>Federal Status</b>
<b><i>Haliaeetus leucocephalus</i></b>	<b>Bald Eagle</b>	<b>Protected</b>
<b>County</b>	<b>TRS</b>	<b>Count</b>
Muskogee	Sec. 26-T14N-R19E	3
Muskogee	Sec. 4-T15N-R19E	1
Muskogee	Sec. 25-T15N-R19E	2
Muskogee	Sec. 26-T15N-R19E	2
Muskogee	Sec. 19-T15N-R20E	1
Muskogee	Sec. 30-T15N-R20E	1
Muskogee	Sec. 31-T15N-R20E	1
Wagoner	Sec. 34-T16N-R18E	4
<b><i>Nicrophorus americanus</i></b>	<b>American Burying Beetle</b>	<b>Endangered</b>
<b>County</b>	<b>TRS</b>	<b>Count</b>
Muskogee	Sec. 8-T14N-R20E	1
Muskogee	Sec. 9-T14N-R20E	2
Muskogee	Sec. 16-T14N-R20E	1
Muskogee	Sec. 17-T14N-R20E	1
Muskogee	Sec. 16-T15N-R20E	1
Muskogee	Sec. 21-T15N-R20E	3
Muskogee	Sec. 28-T15N-R20E	1
Muskogee	Sec. 29-T15N-R20E	1
Muskogee	Sec. 32-T15N-R20E	1
<b><i>Sternula antillarum athalassos</i></b>	<b>Interior Least Tern</b>	<b>Endangered</b>
<b>County</b>	<b>TRS</b>	<b>Count</b>
Muskogee	Sec. 3-T15N-R18E	1
Muskogee	Sec. 6-T15N-R19E	1